

UNREPORTED APPEASEMENT BEHAVIOURS IN THE ASIAN ELEPHANT (*ELEPHAS MAXIMUS*)¹

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Limited detailed information is available on the social behaviour of the Asian Elephant. This paper describes hitherto unreported submissive behaviours exhibited by captive Asian Elephants. These behaviours are rare and have only been observed on a small number of occasions during over 400 hours of observations made over two and a half years. When approached by an adult bull, some adult cows were observed to decline the head and bow down, lowering the head to ground level. This occurred when the bull was in musth, or when he had been separated from the cows for many days. On other occasions, cows kneeled on the rear legs and, in extreme cases, lay prone. A cow was also observed bowing low to a very young calf soon after birth and when his mother was far away. This behaviour may have been intended to reassure the calf that the cow was not a threat. The appeasement of aggression by submission to ritualised mounting was also observed. These behaviours are similar to those observed in some mammalian species, particularly ungulates.

Key words: *Elephas maximus*, elephant, appeasement, behaviour

INTRODUCTION

Ritualised appeasement behaviour is known from a wide range of mammalian species and includes exposure of vulnerable parts of the body, lowering of the head and body, lying down, sexual presentation, and submission to mounting (Ewer 1973).

Early descriptions of aggression in elephants were concerned with the fighting behaviour of adults (Carrington 1958; Kühme 1961, 1963). Estes (1991) has categorised defensive/ submissive displays in African Elephants (*Loxodonta africana*) as: avoidance (turning away, backing up, running away), flattening ears, arching back, raising tail, agitated trunk movements, touching temporal gland, throwing dust, pawing, foot-swinging, swaying, and exaggerated feeding behaviour. In an agonistic encounter between two bulls, the smaller animal flattens its ears, keeps its head lowered, moves backward and sideways and makes writhing trunk movements.

Langbauer Jr. (2000) has summarised apprehension and submissive behaviour in elephants as: jaw out, face check, trunk twitch, trunk curl, swaying, tail up, back in (Kühme 1961; Douglas-Hamilton 1972; Payne and Langbauer Jr. 1992; Poole 1999).

This paper describes hitherto unreported submissive behaviours exhibited by captive Asian Elephants. They include declining the head, bowing the head low to the ground, kneeling on the rear legs, lying prone and submission to ritualised mounting. These behaviours are rare and have only been observed on a few occasions. However, similar behaviours

have been observed in other mammal species (Estes 1991).

Head held low is a submissive posture in Buffalo (*Syncerus caffer*), Giraffe (*Giraffe camelopardalis*), Rhinos (*Diceros bicornis* and *Ceratotherium simum*), Warthog (*Phacochoerus aethiopicus*), zebras and asses (Equidae), and is almost universal in the antelope species (Bovidae). Subordinate Chimpanzees (*Pan troglodytes*) have been observed bowing to alpha males (de Waal 1996). A kneeling posture, representing an intention to lie down, occurs in the Black Wildebeest (*Connochaetes gnou*), however, in some species, kneeling is associated with aggression or dominance. Bull Buffaloes (*S. caffer*) kneel, and rub the face and chin on the ground in an aggressive display. Pfeffer (1967) has described an appeasement ceremony in the Mouflon (*Ovis ammon*), which consists of the superior animal kneeling to be licked by the inferior. Lying-out (lying prone) occurs in *Connochaetes* and in Sable (*Hippotragus niger*). Lowering the hindquarters is a submissive behaviour in the Spotted Hyena (*Crocuta crocuta*) as is lying prone in the Brown Hyena (*Hyaena brunnea*) and in hippos (*Hippopotamus amphibius*), resembling the posture of oestrus females during copulation. Ritualised mounting by dominant animals is well known in primates, e.g. baboons (Cercopithecidae) (Colmenares 1991).

METHODS

The subjects of this study were members of a herd of Asian elephants held at the North of England

Zoological Society's National Elephant Centre (Chester Zoo) in Cheshire, England. At the beginning of the study, the herd consisted of one adult (tuskless) bull, 5 adult cows, a juvenile bull and a calf. Two calves were subsequently born in 2000 (Table 1).

During the day, the herd was confined within an outdoor enclosure surrounded by a dry moat. At night, the animals were housed in an elephant house in which the adult bull was kept separate from the others. Sometimes the adult bull was confined to a separate bull pen during the day. This meant that on occasions the bull and cows were kept completely separate for many days, apart from brief contacts through steel bars.

Data on appeasement behaviour were collected *ad libitum* during a long-term study of the social dynamics of the herd. The herd was observed for a total of 420 hours on 93 days over two and a half years, between the beginning of January 1999 and the end of June 2001.

Most of the observations were made while the elephants were outside. All instances of unusual behaviour were recorded by typing descriptions into a Psion Series 5 handheld computer, and, where possible, by still photography (using a 35 mm camera with a 200 mm or 300 mm lens) and on videotape (using an 8 mm Sony Handycam SC5).

RESULTS

Observations of novel appeasement behaviour made during this study are summarized in Table 2. The most significant elements of this behaviour are ritualized bowing, kneeling on the rear legs, and lying prone. In addition, observations of submission to ritualised

mounting behaviour are described. Some, but by no means all, of this behaviour occurred when the adult bull was in musth.

Ritualised bowing

Adult cows were sometimes observed to decline the head slightly in the presence of the adult bull. During this behaviour, the cow sometimes rubbed her head against his.

In extreme cases, the cow bent down to the ground with one leg tucked under the body, lowering the head to the ground (Fig. 1, 2a). During this behaviour the bull was sometimes seen touching the cow with his trunk and head. On two occasions, bowing behaviour by adult cows to the adult bull was exhibited after an extended period of separation from the bull.

The bowing behaviour was also exhibited by Sheba the adult cow towards the calf PoChin (Fig. 2b). In this context, she may have been signaling the absence of a threat to the calf. Sheba was the only adult in the herd that did not show aggression towards the young calf (usually kicking) during the first few days of his life, apart from his mother. Sheba appeared to exhibit this behaviour when the calf needed reassurance e.g. immediately after birth, when separated from his mother by a long distance, and on his first day outside the elephant house. Sheba acted as an allomother to PoChin from birth by guarding him (especially when asleep) and allowing him to comfort suckle.

Kühme (1963) described kneeling behaviour in captive African elephants, which occurred at the end of a hostile encounter. The appeasing elephant would kneel with ears spread wide in front of its partner, or a dog or a hostile human.

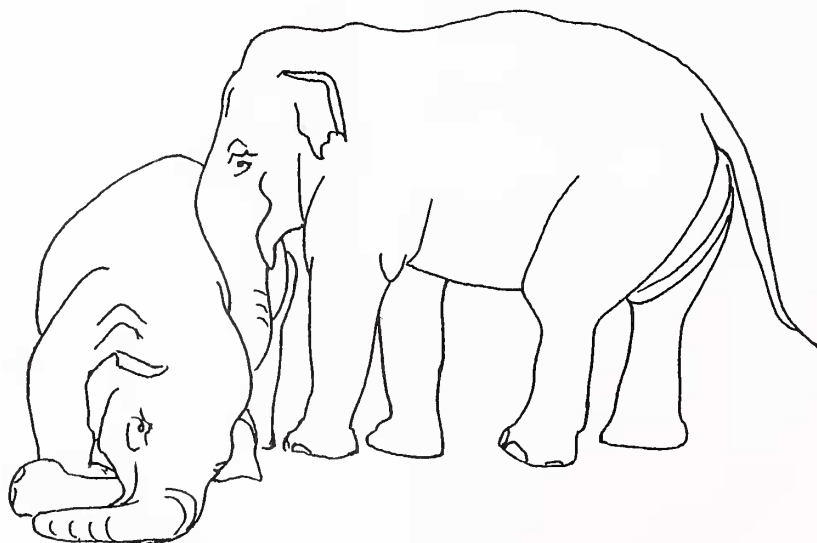


Fig. 1: Kumara bowing to Chang (based on Fig. 2a and other photographs taken during the study)



Fig. 2a: Kumara bowing to Chang while he was in musth (First recording of this behaviour)



Fig. 2b: Sheba bowing to PoChin with his mother, Jangoli, standing nearby

Table 1: The composition of the elephant herd at Chester Zoo

Name/relationship	Origin/Place of birth	Sex	Approximate year of birth	Reproductive status during the study
Chang	Copenhagen Zoo	♂	1981	Proven bull
Sheba	Wild caught / Sri Lanka	♀	1956	Cycling
Thi	Logging camp / Burma	♀	1981	Pregnant/nursing
Kumara	Wild caught / unknown	♀	1966	Non-cycling
Maya	Wild caught / unknown	♀	1968	Non-cycling
Jangoli	Wild caught / Burma	♀	1967	Pregnant/nursing
Upali	Zurich Zoo	♂	1994	Juvenile
Sithami (Chang x Thi)	Born Chester Zoo	♀	1997	Calf
PoChin (Chang x Jangoli)	Born Chester Zoo	♂	2000	Calf
Assam (Chang x Thi)	Born Chester Zoo	♂	2000	Calf

Table 2: Novel appeasement behaviours observed within the herd

Date	Time	Stimulus	Subject animal	Kneeling on rear legs/ crouching	Slightly declined head	Kneeling on forelegs	Bowing low to the ground	Lying prone	Head rubbing	Rump held in mouth	Bull in mush	Notes
1.10.99	10.58	Chang?	Kumara	■							Yes	First record of bowing behaviour. (Fig. 2a)
	11.10	Chang	Kumara			■	■		■			
	13.30	Chang	Kumara	■		■						
4.11.99	12.13	Chang	Kumara	■							Yes	Began with greeting ceremony. Kumara urinated
2.8.00	10.33	Chang	Kumara			■	■				Yes	Bull and cows previously separated for about 15 days (Figs. 4a-d)
	11.15	Chang	Kumara		■				■			
	11.24	Chang	Kumara		■					■		
	11.29	Chang	Kumara							■		
28.11.00	a.m.	Chang	Sheba				■ (x2)				No?	First contact between Chang and herd for many days. Sheba facing Chang inside house
21.9.99	11.15	Chang/ Upali	Maya	■				■			No	Upali attacking Maya. (Figs. 3a-c)
14.7.00	13.53	Upali	Sheba	■							n.a.	Upali had violently attacked Thi earlier
18.7.00	14.30?	PoChin	Sheba				■*				n.a.	Night of PoChin's birth. Jangoli present. Keepers present
20.7.00	?	PoChin	Sheba				■				n.a.	In corral. First day outside. PoChin suckling from Sheba. Jangoli near.
2.8.00	14.46	PoChin	Sheba				■				n.a.	PoChin suckling from Sheba
4.8.00	11.17	PoChin	Sheba				■				n.a.	No other adults present. Mother approx 80-100 m away. Longest distance mother seen from calf to date
	11.21						■					
	11.25						■					
6.9.00	a.m.	PoChin	Sheba				■				n.a.	In elephant house. Keepers near

* bowed low to ground repeatedly when the calf was less than an hour old.
n.a. not applicable
? time unknown or uncertain

Kneeling on rear legs and lying prone

When approached by a bull from the rear, adult cows sometimes crouched or kneeled on one of their hind legs in a posture resembling that adopted during courtship immediately before allowing mounting (Figs 3a-c). This may be a ritualised sexual submissive behaviour. In extreme cases, the cow lay down briefly in a prone position and then stood up (Fig. 4d).

Elephants rarely lie down on the ground, and then usually on their side. Lying prone is not a posture that elephants normally adopt when resting, so it is reasonable to assume that this behaviour has a special significance as a signal to others.

All the incidents involving the appeasement of Chang by the adult cows Sheba and Kumara using this behaviour occurred either when he was in musth (and in a more aggressive state) or after a prolonged period of separation from the cows. Under these circumstances, it might be expected that submissive individuals would need to confirm their status to a dominant animal.

The most impressive sequence of submissive behaviour was recorded from Kumara in response to the presence of Chang on August 2, 2000 (Table 3 and Figs 4a-d). This incident began with Kumara declining her head when Chang approached and culminated in her lying prone briefly as he walked behind and away from her.

Submission to mounting

On two separate days, the adult cow Kumara was observed submitting to mounting by the adult bull Chang while his penis was sheathed. These mountings were

associated with aggressive behaviour.

Incident 1 (February 19, 1999): Chang and Upali pursued and pushed Kumara for a period of 24 minutes. After harassing her for eight minutes, Chang mounted Kumara with his penis sheathed. Fourteen minutes later, after holding her down on the ground, he mounted her again with his penis erect, but failed to penetrate her. During the incident Kumara vocalised frequently, defecated and urinated three times each, including during and after both mountings.

Incident 2 (February 28, 1999): Over a three hour period, Chang intermittently pursued and pushed Kumara. Chang mounted her twice with his penis sheathed (with an interval of approximately one hour). After the second mounting Upali attacked Kumara, and Jangoli attempted to intervene by obstructing Chang. During the incident Kumara vocalised five times, and urinated seven times, including during both mountings. After the first mounting, Kumara also defecated.

In the other 59 adult mountings observed, Chang's penis was always descended prior to mounting and erect during attempts at intromission. During normal sexual behaviour cows did not usually vocalise, urinate or defecate during courtship.

The aggressive behaviour exhibited by Chang during these encounters with Kumara suggests that these mountings were not sexual in nature and may have been a display of dominance. Kumara's allowing him to mount may have been an expression of submission. This interpretation is supported by historical evidence of the relationship between the two animals.

Table 3: Appeasement behaviour exhibited by Kumara towards Chang (August 2, 2000)

Time	Chang's interaction with Kumara	Chang's interaction with other herd members
10.00		Slight aggression towards PoChin
10.22		Mounted Sheba, kicked PoChin
10.26		Mounted Sheba
10.33	Kumara took part in greeting ceremony, then kneeled on front legs and bowed to Chang	Greeting ceremony with herd members
10.37		Chang kicked PoChin
11.10		Chang inspected Sheba's genitals
11.15	Kumara declined head to Chang, and rubbed her head against his (Fig. 4a and b)	
11.22		Chang inspected Sheba's genitals
11.24	Kumara bowed to Chang (Fig. 4c), then he withdrew	
11.27	Chang returned to Kumara and held her rump in his mouth	
11.29	Chang crossed behind Kumara. She lay prone for a few seconds while he passed, then stood up (Fig. 4d)	
11.33		Chang kicked PoChin
11.52		Chang kicked PoChin
11.57		Chang hit PoChin with trunk
12.05	Chang hit Kumara with his head. Jangoli went to stand with her. Chang withdrew with Jangoli.	



Figs 3a-c: a. Chang (left) approaches Maya from the rear, b. Maya sits down when harassed by Chang, c. Upali (right) joins Chang in harassing Maya



Figs 4a-d: Sequence of photographs of Kumara appeasing Chang taken over a period of 14 min, a. Kumara (left) rubbing her head against Chang (1116 hrs), c. Kumara (right) bowing to Chang (1129 hrs), b. Kumara (left) rubbing her head against Chang (1115 hrs), d. Kumara (left) lying prone briefly as Chang (middle) walks behind her from left to right (1124 hrs)

The two elephants first met in May 1989 when Kumara was moved to Chester, when Chang was 7.5 years old and Kumara was approximately 22 years old. Kumara regularly attacked Chang when he was young, but as he grew larger, he began to retaliate. At the time of this study, Kumara bore extensive scars on her back resulting from previous attacks by Chang (Jones, pers. comm.).

DISCUSSION

Previously unreported appeasement behaviours were displayed by adult female Asian Elephants in situations where they were being attacked or harassed by bulls, or following extended periods of separation from the adult bull. Similar behaviour appeared to be used by an adult cow to signal the absence of threat to a young, unrelated calf.

Lowering the head is an anti-threat appeasement behaviour in elephants (Manning 1972), since aggressive animals generally hold the head high. Lying down may also be categorised as an anti-threat behaviour. Crouching down and kneeling on the rear legs may be intended to appease an aggressor by arousing a conflicting, sexual tendency. In the few incidents of submission to mounting that were observed, this appeared to prevent further aggression, at least temporarily.

Appeasement behaviours in Asian elephants may serve the function of allowing subordinate animals to remain within a social group. It is interesting that the adult bull showed considerable aggression towards Kumara at the beginning of the study, but two and a half years later there was little sign of antagonism between them.

It is not surprising that the appeasement behaviours reported here exist in the Asian Elephant, as they are similar to behaviours displayed by many ungulate species. Neither is it surprising that appeasement behaviour of this type has not previously been reported from the wild. Studies of captive Rhesus Macaques (*Macaca mulatta*) have shown that submission and appeasement gestures increase in crowded conditions (de Waal 1996). Such behaviour is more likely to be observed in a captive environment, because animals that behave antagonistically towards each other cannot easily avoid contact.

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